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Science 8

Module 5

Freshwater and Saltwater Systems

Home Instructor's Guide and Assignment Booklet 5A

Learning Technologies Branch

Alberta LEARNING

Science 8
Module 5: Freshwater and Saltwater Systems
Home Instructor's Guide and Assignment Booklet 5A
Learning Technologies Branch
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The Learning Technologies Branch acknowledges with appreciation the Alberta Distance Learning Centre and Pembina Hills Regional Division No. 7 for their review of this Home Instructor's Guide and Assignment Booklet.

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	

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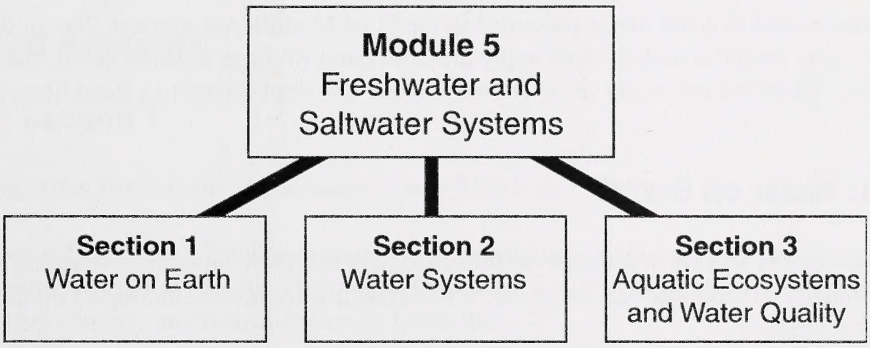
Module 5: Freshwater and Saltwater Systems

The major emphasis of this module is Social and Environmental.

Oceans and freshwater bodies cover two-thirds of Earth's surface. That's why Earth is sometimes described as "the water planet." By exploring aquatic systems, a student comes to appreciate the lively nature of these systems. The student learns about the interaction of landforms, sediments, water, and climate. The student also looks at the distribution and health of living things in aquatic environments and the supply and quality of water for human use.

Note that a student would benefit from a visit to a pond, a lake, an aquarium, or a pet store. Such a visit would allow a student to see a wide variety of aquatic life.



Assessment

The assessment of this module will be based on two Assignment Booklets. These will be weighted as follows:

Assignment Booklet 5A	
Section 1 Assignment	**23 marks**
Section 2 Assignment	**40 marks**
Assignment Booklet 5B	
Section 3 Assignment	**29 marks**
Final Module Assignment	**53 marks**
TOTAL	**145 marks**

A special issue related to water use is presented in the Final Module Assignment. The student must research the issue. Then the student must apply these research findings to make an informed decision about the issue. To do the necessary research, the student will need access to a local library or the Internet.

Section 1: Water on Earth

The first lesson in this section introduces the idea that there is a fixed amount of water on Earth. Earth's water is continually cycling through the global water system. People have an impact on the quality and quantity of this water.

Through their treatment of water, humans can positively or negatively affect all organisms in the biosphere. The student studies the distribution of water and some interactions of water systems with the land, the atmosphere, and with people.

The second lesson looks at the fact that 75% of the Earth's fresh water is locked up in ice. In this lesson the student examines ice forms, studies how ice interacts with the land, and determines how humans can make use of ice.

Safety goggles and latex gloves must be worn as a precaution while doing activities or investigations that involve the manipulation of materials and apparatus.

The following materials will be needed to complete this section.

Section 1: Lesson 1

- a 1-L container
- a measuring cup

- a 5-mL measuring spoon or a teaspoon
- a 15-mL measuring spoon or a tablespoon
- an eye dropper
- two small bowls

Section 1: Lesson 2

- a stream table or a large baking tray
- sand or soil
- an overhead lamp with a reflector as a heat source
- a chunk of ice (5 cm to 8 cm across) containing sand, gravel, and clay
- books or wooden blocks
- a metric ruler

Suggested Answers

Section 1: Lesson 1

4. Textbook steps 1 to 3 from "Procedure," page 367:

1. The student's list may include some of the following uses: snow skiing, fishing, drinking, irrigation, swimming, cooling engines, animal homes, firefighting, showering, cleaning dishes, watering animals, and hydro-electricity production.

2. Answers will vary. The student should list uses not shown in the diagram. Examples could include street cleaning, removal of waste, making food, kayaking, and industrial processes.

3. Answers will vary depending on how uses are classified. Classification groups could include domestic, industrial, recreational, agricultural, short-term and long-term uses, human and wildlife needs, and so on.

Section 1: Lesson 2

12. Textbook questions 3, 5, and 7 of "Topic 2 Review," page 388:

3. **(a)** Glacial erosion occurs when a glacier scrapes surface material from an area and carries or pushes it to another location.

   (b) Glacial deposition occurs when a glacier leaves behind materials as it advances or retreats.

5. Glaciers store fresh water and provide valuable clues about the past.

7. These land areas were once under seas or oceans. Major geological events like the movement of tectonic plates and mountain building have left these areas high and dry.

Section 2: Water Systems

This section is about Earth's non-frozen water. The student sees the interactions both within and among water systems. The first lesson deals with fresh surface water and ground water. A major focus is the interactions between water and the land. This lesson also introduces some important issues that arise from having too little or too much water.

The second lesson is about oceans. The student explores these questions: What makes water salty? What does the ocean floor look like? What causes waves, currents, and tides? How do saltwater systems and the land interact?

The following materials will be needed to complete this section.

Section 2: Lesson 1

- a graduated cylinder or a measuring cup
- paper towels
- a large baking tray
- wooden blocks or books
- a protractor (optional)

Section 2: Lesson 2

- a balloon
- a waterproof felt marker
- a lamp or a flashlight
- a tennis ball or another small, round object

Suggested Answers

Section 2: Lesson 1

6. Steps 1 and 3 of "Procedure" from the textbook, page 393:

Answers will vary depending on where the student lives. Sample answers are shown for a student in Drumheller, Alberta.

7. Textbook questions 1 and 3 of "What Did You Find Out?" on page 393:

Answers will vary for these questions due to different locations.

1. The headwaters of any system will be at the highest elevation in the basin. For the student in Drumheller, the headwaters are in the Rocky Mountains.

3. For the Drumheller student, the following are major centres in the Basin: Edmonton, Calgary, Lethbridge, Saskatoon, North Battleford, Yorkton, Brandon, and Winnipeg.

10. Answers will vary. Check that the procedure is safe. Also check that the procedure relates to the question being investigated and can be done with materials at hand.

Sample answers are provided.

a. The manipulated variable is the type of surface. The responding variable is the time it takes for water to start spilling off the bottom edge.

b. Some controlled variables are these:

- the angle of the cake pan's slope
- the amount of water poured on the cake pan

c. How does the type of surface affect the time it takes for water to start spilling off the bottom edge of the cake pan?

d. The procedure must show how to change the manipulated variable and how to measure the responding variable. Controlled variable(s) should be mentioned.

A brief description follows.

Support a cake pan upside down. The pan's slope is to be approximately 20° (CV). It should be kept the same for the investigation. Place the lower edge over a basin. Use wooden blocks to keep the pan in place.

With a stopwatch, time how long the water takes to start coming off the bottom edge after you have begun to pour the water. Pour 100 mL just down from the top edge of the pan. The elapsed time is for water on an impermeable surface. Record your observation.

Change the surface by placing paper towels on the pan surface. Again, measure the time it takes for 100mL of water (CV) to spill off the bottom edge. Record your observation.

Change the surface by placing a sponge on the pan surface. Again, measure the time it takes for the water to spill off the bottom edge. Record your observation.

e. A sample data table for recording observations (based on the procedure in d.) is as follows.

Flow Time of Water Over Different Structures	
Type of Surface	**Flow Time(s)**

11. The conclusions should indicate how the responding variable changes with a change in the manipulated variable.

Answers will vary. Samples follow.

- The type of surface affects the time for water to flow a certain distance. The more porous the surface, the slower the water goes.
- The type of surface affects the amount of water that flows off the surface. The more porous the surface, the more water that stays on the surface.
- The slope of the surface affects the water flow. The greater the surface's slope, the faster the water flows.

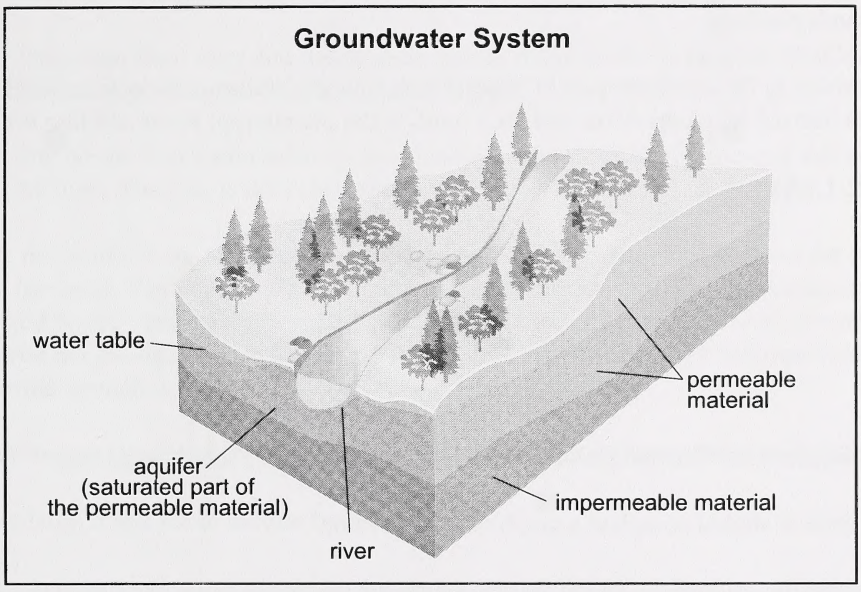
12. Answers will vary. Sample answers follow.

Raindrops falling on *a paved road* travel more quickly that raindrops falling on *a lawn*. This is because *the road is less permeable than the lawn.*

Raindrops falling on *a hillside* travel more quickly than raindrops falling on *a football field.* This is because *the hillside is on a greater slope than the football field.*

Raindrops falling on *a road down a hill* travel more quickly than raindrops falling on *a parking lot.* This is because *the hillside road is on a greater slope than the parking lot.*

16. Diagrams will vary. The water table must meet the level of the river. The impermeable layer must be below the permeable layer. The water table must be within the permeable layer. A sample sketch follows.



17. A river is a large, flowing body of water. Contamination is any addition of undesirable substances to the environment, for example, to ground water. A point source is a source of contaminants from a small, well-defined area. A non-point source is a source of contaminants from a large area.

18. **a.** The water table will drop if too much water is removed from the aquifer.
b. The water table will drop if there are several years of lower than average precipitation.

20. **Textbook questions 1 and 2 from "Find Out Activity: Predicting Floods," page 409:**

1. The basin represented in the top graph is more likely to flood. The peak flood occurs in six hours, and it has the higher flow rate. The other basin has a lower flow rate over a longer time.

2. Answers will vary. The first basin may be in steep terrain or drain a larger area. The basin may have less vegetation growing in it. It may have a less permeable surface or less soil over the bedrock. The basin may be located in an area that receives more rain in a shorter time. The river channel may be straighter and its bottom may be smoother. The water table may already be high, making the ground saturated from previous rains. The opposite would be the case in the second basin.

21. Textbook questions 4 and 5 from "Topic 3 Review," page 409:

4. Aquifer depletion occurs when too much water is removed from the ground. Too little precipitation soaking in can result in a lowered water table. Using less water and increasing wetlands can help.

5. Rainwater in the southeast part of Alberta falls into the Missouri River watershed. From there, it flows into the Missouri River and then south to the Mississippi River and into the Gulf of Mexico.

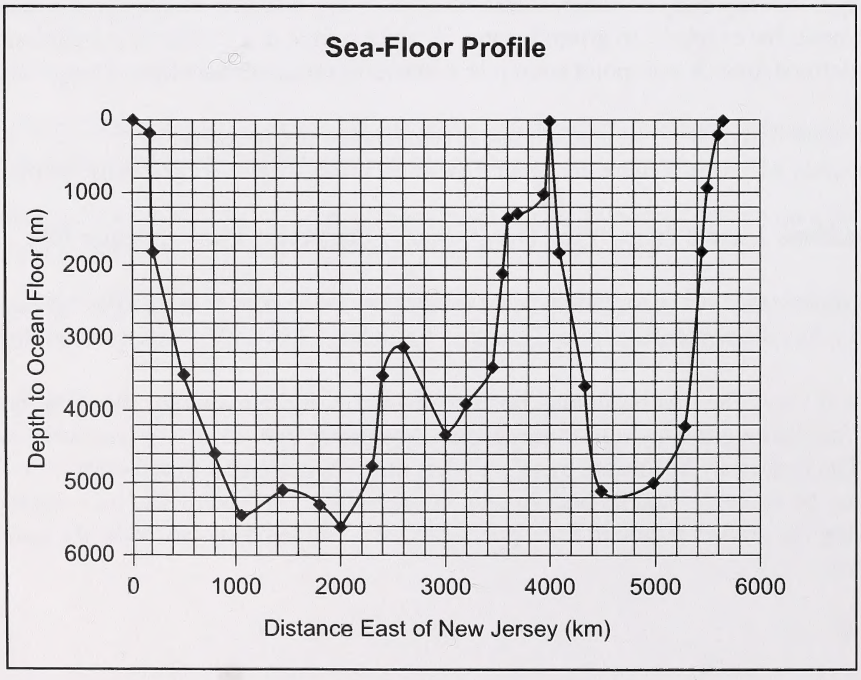
Section 2: Lesson 2

2. a. D
b. C
c. B
d. A
e. E

3. Textbook question, "Investigation 5F: Mapping the Ocean Floor," page 416:

a. The student should complete a graph of the sea floor.

Compare the student's graph to the one following.



b. Textbook questions 1 to 3 from "Analyze," page 416:

1. **(a)** The ocean floor has a fairly steep and steady decline—from 165 m to 5450 m— showing the continental slope.

(b) The ocean floor rises and drops again before rising to the surface (at 4000 km east of New Jersey) at the mid-ocean/Atlantic Ridge.

(c) The ocean floor again starts to rise steadily to the shoreline on the east side of the Atlantic. This rise is the continental slope.

2. No, the profile does not give an accurate picture of the ocean floor because the two scales are not the same. The depth scale is in metres and the distance scale is in kilometres. Both scales should be the same to show an undistorted picture of the ocean floor. Another reason for the profile not giving an accurate picture is that the scales on the graph are much too small to provide enough detail.

3. This area is above sea level. These are the islands of the Azores on the mid-Atlantic ridge.

4. A wave is a large ripple set in motion by the wind.

A swell is a long, smooth wave caused by winds and storms far out at sea.

A breaker is a wave that collapses in shallow water or on shore.

A longshore current is a current due to waves colliding with a shore at a slight angle. The longshore current flows along the coast and shapes it through erosion and deposition.

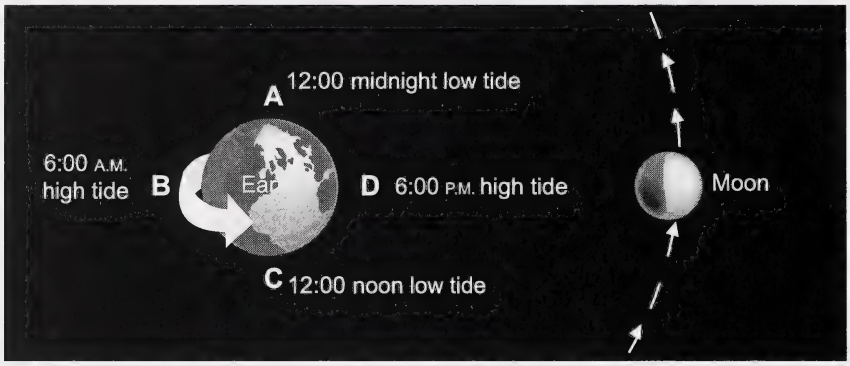
5. The distance from crest to crest is a *wavelength.* Between the crests there is a *trough.*

6. Possible questions are the following:

- How does the type of beach material (MV) affect the size of the beach (RV)?
- How does the type of beach material (MV) affect the shape of the beach (RV)?
- How does the slope of the beach (MV) affect the size of the beach (RV)?
- How does the slope of the beach (MV) affect the shape of the beach (RV)?

12. Textbook questions 1 and 2 of "What Did You Find Out?" from page 425:

1. The student may use a diagram such as the following or refer to Figure 5.66B on page 424 of the textbook. The following explanation is based on this diagram.



At Town X you would have two high tides and two low tides each day. Suppose you are at Town X at approximately 12:00 midnight. At this position you would observe a **low tide**. That's because you are in a position between the side of the Earth facing the Moon and the side facing away from the Moon. Water has been pulled away from your position to make bulges on the side facing the Moon and the side opposite the Moon.

At approximately 6:00 A.M. you are on the side facing away from the moon, where the water forms a bulge. Town X moved to this position because the Earth made one-quarter of a rotation in the six hours after 12:00 midnight. You experience a **high tide** because of the bulge of water.

By approximately 12:00 noon, Town X has moved again between the side of the Earth facing the Moon and the side facing away from the Moon. It has moved to this position because the Earth made one-quarter of a rotation in the six hours since 6:00 A.M. At this position you observe a **low tide**.

By approximately 6:00 P.M., Town X has moved to the side facing the Moon, where water forms a bulge. It has moved to this position because the Earth made one-quarter of a rotation in the six hours since 12:00 noon. Because of the bulge of water, you experience a **high tide** in this position.

You can see that the low-tide-to-high-tide cycle repeats twice in any 24-hour period. Therefore, there are two high tides and two low tides each day.

2. The student may refer to Figures 5.65A and 5.65B on page 423 of the textbook. The Earth-Moon system is revolving around the Sun. The system's position relative to the Sun creates spring and neap tides. When the Sun and Moon line up at the full and new Moons, the combination of their gravities produces the high spring tides. In the first and third quarters, the Sun and Moon are at right angles to each other relative to Earth. The gravitational forces of the Sun and Moon oppose/balance each other to cause the low neap tides.

15. Climate is the seasonal patterns of weather conditions at a particular location over several years.

Weather is the atmospheric conditions at a particular time and place. Weather includes temperature, moisture, cloudiness, and windiness.

Heat capacity is the measure of how much energy 1 kg of a substance must gain or lose to change its temperature 1°C.

16. a. The Gulf Stream keeps Britain's climate mild during the winter.
b. The Gulf Stream comes from the Caribbean Sea.

17. Textbook questions 2, 3, and 6 of "Topic 4 Review," page 430:

2. **(a)** Ocean ridges, which are the youngest areas of the sea floor, are formed by the sea floor spreading as lava pushes up from volcanic eruptions in the floor. The ridges push the tectonic plates farther apart.

   (b) Ocean trenches are formed where a heavier continental plate moves under a lighter ocean plate.

3. Factors affecting the height of a wave are wind speed, how long the wind blows, how far along the water the wind blows, and the shape of the bottom leading up to the shore.

6. Warm currents start in a warm climate, where they gain thermal energy. Cold currents start in a cold climate, where they lose thermal energy.

   Note that the density of either a warm current or a cold current is different from the surrounding water. That's because temperature affects the density of water. This difference in density keeps the water of the currents from mixing with the surrounding water. Without the mixing, there is little heat transfer to or from the surrounding water. Therefore, the currents maintain their temperature longer.

Section 2 Review

Textbook questions 1 and 2 and 9 to 13 of "Wrap-up: Topics 3 to 4," page 431:

1. **(a)** run-off **(b)** ground water **(c)** watershed **(d)** deposition

2. **(a)** *Waves* and *swells* are both produced by winds.

(b) *Tides* are produced by [the] Moon's gravitational effect.

(c) *Ocean ridges* and *tsunamis* are produced by undersea volcanic activity.

(d) *Trenches* are produced where one tectonic plate moves under another.

9. Breakers are created when waves drag on the sea floor as they reach the shallow areas. The faster water at the top of the wave moves ahead of the slower water at the bottom and then crashes down. Breaking waves push objects, like surfers, forward.

10. The gravitational pull of the Moon causes high tides twice a day.

11. Sediments on the abyssal plains come from the continents. Rivers carry the sediments to the ocean.

12. Large bodies of water affect climate and weather in two ways:

- Water has a high heat capacity, which moderates the temperature of the air above and around it. This means cooler summers and warmer winters.
- Evaporation increases humidity levels. This causes a wetter climate around the water.

13. Answers will vary. Groundwater contamination could be reduced by

- wise water management
- decreasing the release of toxic substances
- public education
- environmental laws and standards
- better containment and treatment facilities
- decreasing the use of fertilizers and pesticides

ASSIGNMENT BOOKLET 5A

Science 8
Module 5: Section 1 Assignment and Section 2 Assignment

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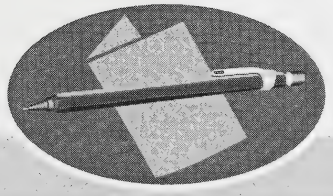
Science 8

Module 5

Freshwater and Saltwater Systems

Assignment Booklet 5A



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FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 1 Assignment	23	
Section 2 Assignment	40	
	63	

Teacher's Comments

Science 8
Module 5: Freshwater and Saltwater Systems
Assignment Booklet 5A
Section 1 Assignment and Section 2 Assignment
Learning Technologies Branch

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ASSIGNMENT BOOKLET 5A
SCIENCE 8: MODULE 5
SECTION 1 ASSIGNMENT AND SECTION 2 ASSIGNMENT

Your mark for this module will be determined in part by how well you do your assignments.

This Assignment Booklet is worth 63 marks out of the total 145 marks for the assignments in Module 5. The value of each assignment and each question is stated in the left margin.

Work slowly and carefully. If you have difficulty, go back and review the appropriate section.

Be sure to proofread your answers carefully.

Section 1 Assignment: Water on Earth

(23)

Read all parts of your assignment carefully and record your answers in the appropriate places.

Circle the letter of the best response for questions 1 and 2.

(1) **1.** Of all Earth's water, 97% of this water is

A. salt water in oceans
B. fresh water in lakes
C. fresh water underground
D. frozen water in glaciers and icecaps

(1) **2.** Little Lake Manitou is a unique lake because it

A. is below sea level
B. contains fresh water
C. is surrounded by land
D. contains salt water

(2) **3.** List two recreational activities in which a body of water is used.

_____

_____

Circle the letter of the best response for questions 4 and 5.

(1) **4.** On average, how much water does a person need to drink every day?

A. 0.8 L
B. 1.2 L
C. 2.5 L
D. 3.9 L

(1) **5.** In which of the following examples are phases of the water cycle in a correct order?

A. evaporation, condensation, precipitation, run-off
B. condensation, evaporation, precipitation, run-off
C. evaporation, precipitation, condensation, run-off
D. evaporation, precipitation, run-off, condensation

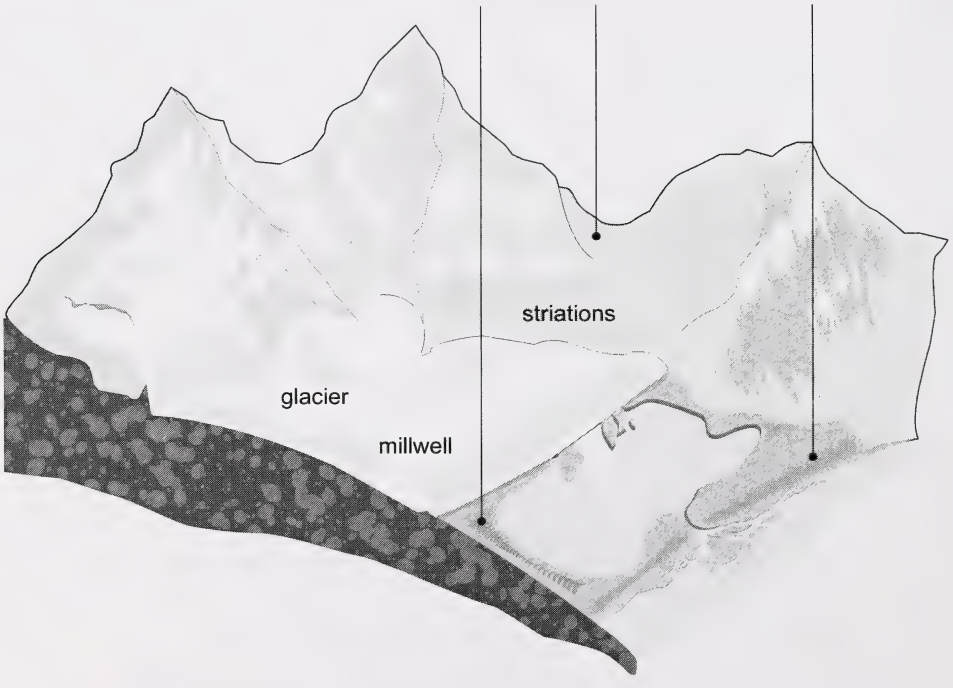
Return to page 18 of the Student Module Booklet and continue with Lesson 2.

(1) **6.** Circle the letter of the best response.

A winding ridge of sand and gravel deposited in tunnels beneath a glacier is a (an)

A. drumlin
B. esker
C. millwell
D. moraine

(3) **7.** Identify each of the glacial features indicated by the dots in the diagram.



(5)

8. Match each description on the left with its most closely related term from the right. Fill in the answer blanks to the left of the descriptions.

_____ **a.**	water that flows out of a glacier	A. till
_____ **b.**	scratches made by rock fragments within a moving glacier	B. striation
_____ **c.**	any unsorted material deposited by a glacier	C. meltwater
_____ **d.**	a ridge formed by streams beneath a glacier	D. ice field
_____ **e.**	a bowl-shaped hollow formed by glaciation	E. esker
		F. cirque

(4)

9. Carefully study the valley profile illustrated in the following diagram.

The profile of the valley shows that it was shaped by three separate events during its formation. Indicate what these events were. Explain your answer.

_____

_____

_____

_____

_____

10. The toe of a retreating glacier moves uphill.

(2)

a. Explain why a glacier can be a retreating glacier even though it is continuously flowing forward and downhill.

_____

_____

(2) **b.** Explain how an increase in the temperature of the atmosphere may cause a glacier to retreat.

_____

_____

_____

Return to page 26 of the Student Module Booklet and continue with Section 2.

(40)

Section 2 Assignment: Water Systems

Read all parts of your assignment carefully and record your answers in the appropriate places.

1. On the continent of North America, there is a special ridge. On one side of this ridge, water flows into the Pacific Ocean. On the other side of this ridge, water flows into the Arctic Ocean and the Atlantic Ocean.

(1) **a.** What is this ridge called?

_____

(1) **b.** Where is this ridge?

_____

(1) **2.** Circle the letter of the best response.

Which drainage basin covers most of southern Alberta?

A. the Churchill River drainage basin
B. the Mackenzie River drainage basin
C. the Missouri River drainage basin
D. the Saskatchewan-Nelson River drainage basin

3. Fill in the blanks in the following sentences.

(1) **a.** Water that doesn't soak into the ground but runs over the Earth's surface is called

_____

(1) **b.** Upstream areas that form the source of a watershed are called the

_____ of the watershed.

(3) **4.** Fresh water is held above the ground in bodies of water. Name three types of such bodies of water.

_____

(1) **5.** Circle the letter of the best response.

Fresh water under Earth's surface is found in groundwater systems. Going down from Earth's surface, which is the correct order of the parts of a groundwater system?

A. unsaturated permeable material, aquifer, water table, impermeable material
B. unsaturated permeable material, water table, aquifer, impermeable material
C. impermeable material, water table, aquifer, unsaturated permeable material
D. unsaturated permeable material, impermeable material, water table, aquifer

6. Refer to "Investigation 5D: What Happens to Run-off?" on page 395 of the textbook.

A group of students developed their own procedure for "Investigation 5D." They investigated the question: "How does slope affect run-off?"

The procedure involved pouring 100 mL of water so that it flowed over a baking pan. The pan was supported at various angles. The flow time was the time needed for the water to start spilling off the bottom edge.

After the procedure was approved, the group recorded the following data.

Flow Time of Water Over Different Surfaces

Slope of Surface (°C)	Flow Time (s)
20	5
30	3
50	1

(1) **a.** Name the manipulated variable for the group's investigation.

_____

(1) **b.** Name the responding variable for the group's investigation.

_____

(1) **c.** Name a controlled variable that the group should be aware of while doing the investigation.

_____

(1)

d. Based on the group's data, what conclusion can they make about the effect of the Earth's surface on run-off?

_____

_____

(1)

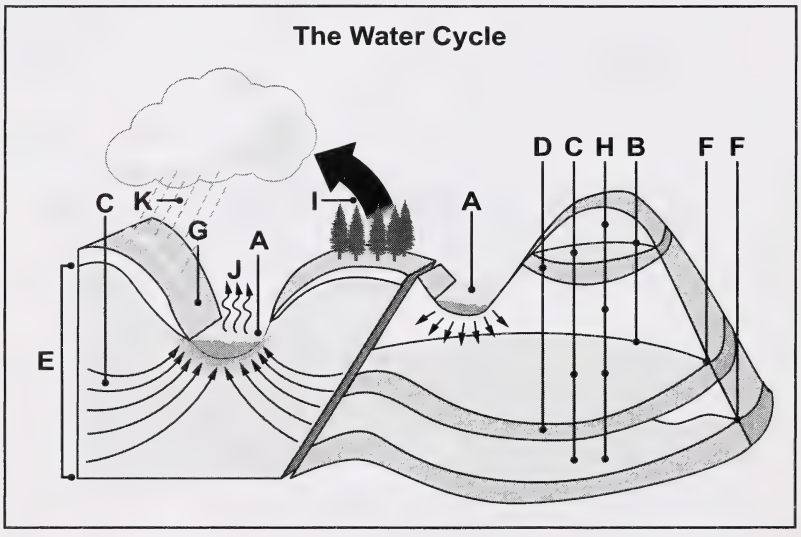
7. Why does deposition occur in a river where its slope becomes flat and its banks become farther apart?

_____

_____

(5)

8. A student made the following diagram to illustrate the connection between water, landforms, and climate. Letters were used to indicate parts of the water cycle. The student did not include a legend to show what the letters meant. **Note:** You will notice that some letters are repeated—they identify the same feature.

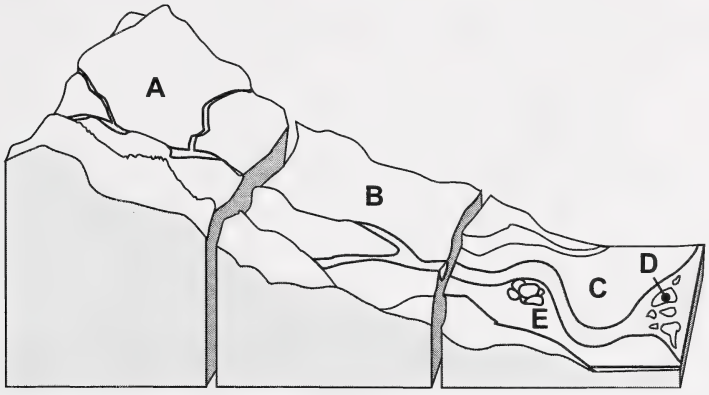


Identify the parts of the diagram. Fill in the blanks with the correct letters from the diagram. The first one is done for you.

a. *D* impermeable rock
b. _____ aquifer
c. _____ evaporation
d. _____ ground water
e. _____ permeable rock
f. _____ precipitation
g. _____ run-off
h. _____ where spring may flow
i. _____ surface water
j. _____ transpiration
k. _____ water table

(5)

9. Use the following diagram and the list of terms to complete the questions.



clarity	non-point	drainage basin
sediment load	sedimentation	headwaters
streamflow	most turbulent	watershed
flood plain		

Fill in the blanks with the best choices from the list. Use each term only once.

a. This diagram illustrates a(n) _____ or

_____.

b. Area A is known as the _____. The precipitation in this area

affects the _____.

c. Area C is a(n) _____, an area of

_____.

d. In Area D, the water slows and drops its _____. As a result, the

water's _____ will increase.

e. Suppose that in Area B there is a large, recent clear-cut logging region. It is likely that

soil erosion takes place, making this region a(n) _____ source of particulates.

f. The water is likely to have the highest oxygen content in Area A because it is likely the

_____.

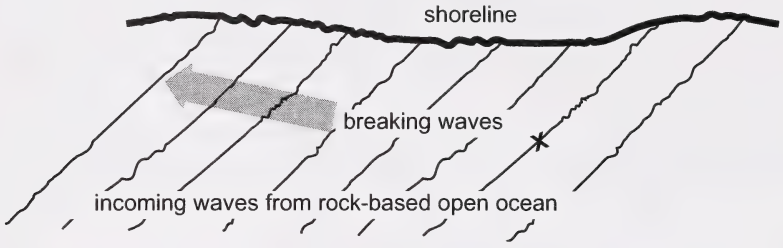
Return to page 37 of the Student Module Booklet and continue with Lesson 2.

(1) **10.** Circle the letter of the best response.

Which statement best describes the action of waves on shorelines?

A. Large waves remove sediment from shore and small waves deposit sediment on shore.
B. Large waves deposit sediment on shore and small waves remove sediment from shore.
C. Both large waves and small waves remove sediment from shore.
D. Both large waves and small waves deposit sediment on shore.

11. Refer to the following diagram to answer 11.a. to 11.c.



The incoming waves are high. They come into shore at an angle rather than straight on. They break as they come close to the shoreline.

(2) **a.** What kind of water flow is caused by the waves? Explain.

_____

(3) **b.** What effect will the waves and flow of water have on the beach? Explain.

_____

_____

_____

_____

(2) **c.** Give two ways the beach could be protected from these effects.

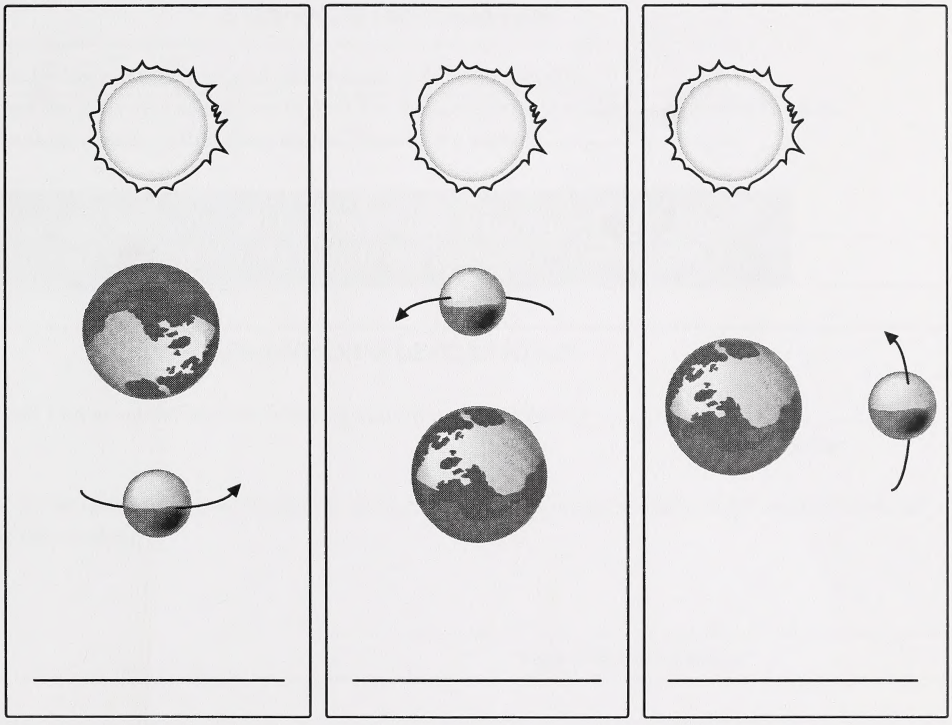
_____

_____

_____

_____

(3) **12.** Ocean tides cause the water level along beaches to change in almost daily cycles. The tidal range of tides is affected by the Sun's position in comparison to the Moon's position. Changes in their positions lead to neap tides and spring tides. In the answer blanks at the bottom of each diagram, indicate which type of tides is represented by each diagram.



(1) **13.** Circle the letter of the best response.

Which statement best relates to the formation of ocean ridges and trenches?

A. Ridges and trenches form where tectonic plates move toward each other.

B. Ridges and trenches form where tectonic plates move away from each other.

C. Ridges form where tectonic plates move toward each other and trenches form where tectonic plates move away from each other.

D. Ridges form where tectonic plates move away from each other and trenches form where tectonic plates move toward each other.

(2) **14.** Refer to the illustration of the ocean floor on page 430 of the textbook.

Four features of the ocean floor are pointed out. List the missing labels in the illustration, going from left to right.

_____

_____

(2) **15.** Explain why Canada's east coast has much colder winters than Canada's west coast?

Submit your completed Assignment Booklet 5A to your teacher for assessment.
Then return to page 48 of the Student Module Booklet and begin Section 3.

ASSIGNMENT BOOKLET DECLARATIONS

The Student's Declaration is to be signed by a student registered at the Alberta Distance Learning Centre. If the student is under 16, the Supervisor's Declaration is to be signed by the student's supervisor, who is usually a home instructor, teacher, or home-schooling coordinator. Failure to complete this page may invalidate the assignment results.

STUDENT'S DECLARATION

- I have followed the instructions outlined in the Student Module Booklet.
- I have completed the activities to prepare myself for the assignments in this Assignment Booklet.
- I completed the assignments in this Assignment Booklet by myself.

_____

Student's Signature

SUPERVISOR'S DECLARATION

I hereby certify that I have supervised the learning activities completed by _____.

Student's Name

I also certify that to the best of my knowledge the assignments in this Assignment Booklet were completed independently by this student.

_____

Supervisor's Signature

If you, the student or supervisor, have any comments or observations regarding this module, write them in the following space.

_____

_____

_____

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